

CLAIMS:

1. A hinge mechanism of portable phone comprising:
a first hinge housing including a first rotating chamber
5 having an upper portion opened and a first hinge chamber formed
at a side of the first rotating chamber, for mechanically
connecting a cover to a body;
a first hinge part which is installed to the first hinge
chamber, for opening and closing the cover; and
10 a first rotary part which is installed to the first rotating
chamber, for rotating the cover.

2. The hinge mechanism of portable phone according to
claim 1, wherein the first rotary part includes: a first cylinder
15 which has a first cylinder chamber formed at a lower surface
with opening, a first cylinder aperture formed at an upper surface,
and a first arm projected from upper portion to be combined with
the cover; a first compressed spring installed to the first
cylinder chamber; a first slip member which has a first slip
20 opening at a center thereof and which is installed under the
first compressed spring to the first cylinder chamber; and a
first center shaft which is formed at a bottom surface of the
first rotating chamber so as to sequentially extend through the
first slip opening, the first compressed spring, the first
25 cylinder chamber and the first cylinder aperture.

3. The hinge mechanism of portable phone according to
claim 2, wherein a pair of leaf spring inserting holes is formed
on an outer peripheral surface of the first cylinder, and a pair
30 of leaf spring installing holes is formed on an outer peripheral

surface of the first slip member, in which a pair of leaf springs is respectively installed in the leaf spring inserting holes such that a center portion of the leaf spring is inserted in the leaf spring inserting hole.

5

4. The hinge mechanism of portable phone according to claim 2, wherein a first center projection is formed on a peripheral surface of the first center shaft, and a first slip groove is formed on an inner surface of the first slip member, 10 in which the first center projection is inserted.

5. The hinge mechanism of portable phone according to claim 2, wherein a first cylinder projection is formed on the an outer peripheral surface of the first cylinder, and a pair 15 of first stoppers is formed on an inner surface of the first cylinder opposite to the first rotating chamber, to which the first cylinder projection is latched.

6. The hinge mechanism of portable phone according to 20 claim 2, wherein the first housing has a first cutoff portion through which a wire enters the first rotating chamber to electrically connect the cover to the body.

7. The hinge mechanism of portable phone according to 25 claim 2, wherein a first annular groove is formed at an end of the first center shaft, in which a first sealing is fixedly inserted so as to fix the first cylinder to the first center shaft.

30 8. The hinge mechanism of portable phone according to

claim 1, wherein the first hinge chamber has an end opened and includes a first guide recess formed from an opening end to an interior thereof, wherein the first hinge part includes a first hinge spring which is installed in the first hinge chamber; a 5 first rotary hinge part which is inserted in the first hinge chamber at an outside of the first hinge spring, which has a first rotary hinge aperture formed at a center thereof, of which a first rotary hinge projection is formed on an outer surface, and which has a first rotary hinge surface continuously extending 10 to the first rotary hinge aperture while having two-wave type of bending when rotating each time; a first rotary fixing part which has a first fixing hinge hole formed opposite corresponding to the first rotary hinge aperture so as to enclose the first fixing hinge part and which has a first fixing hinge surface 15 corresponding to the first hinge surface at a side thereof and a first fixing hinge projection formed on the other side to be fixed to the body; and a first hinge shaft extending through the first fixing hinge hole, the first rotary hinge aperture and the first hinge spring to be fixed to the first hinge chamber.

20

9. The hinge mechanism of portable phone according to claim 1, wherein the first hinge chamber opens at a top portion thereof, which has a first hinge chamber hole formed at a side surface thereof, and

25

the first hinge part includes: a first rotary hinge part which is fixedly installed in the first hinge chamber, which has a first rotary hinge hole formed at a center thereof and which has a first rotary hinge surface continuously extending toward the first rotary hinge hole while having two-wave type 30 of bending when rotating each time; a first fixing hinge part

which is rotatably installed in the first hinge chamber, which has a first fixed hinge surface corresponding to the first rotary hinge surface at a side thereof, which has a first hinge shaft formed on the first fixed hinge surface to be inserted in the 5 first rotary hinge hole and which a first fixed hinge projection formed at the other side thereof to be inserted in the first hinge chamber hole; and a first hinge spring which is installed in the first hinge chamber, for elastically urging the first rotary hinge part to the first fixed hinge part.

10

10. The hinge mechanism of portable phone according to claim 1, wherein the first hinge chamber opens at a side thereof, which has a first guide recess formed from an open end to an interior, and

15

the first hinge part includes a first hinge spring which is installed in the first hinge chamber; a first rotary hinge part which is inserted in the first hinge chamber to enclose the first hinge spring, which has a first rotary hinge hole formed at a center thereof, which has a first rotary hinge projection formed on an outer surface to be combined with the first guide recess and which has a first plain rotary hinge surface; a first fixed hinge part which enclose the first fixed hinge part, which has a first fixed hinge hole corresponding to the first rotary hinge hole, which has a first fixed hinge surface formed at a 20 side thereof to face the first rotary hinge surface, and which a first fixed hinge projection formed at the other side to be fixed to the body; and a first hinge shaft which extends the first hinge hole, the first rotary hinge hole and the first hinge spring to be fixed to the first hinge chamber.

25

11. The hinge mechanism of portable phone comprising:
a second housing which includes a second rotary chamber
having a top portion opened and a hinge chamber formed at a side,
for mechanically connecting a cover to a body;
5 a second hinge part which is installed in the second hinge
chamber, for opening and closing the cover; and
a second rotary part which is installed in the first rotary
chamber, for rotating the cover,
wherein the second rotary part includes: a second cylinder
10 which has a second cylinder chamber opened at a bottom thereof,
which has a second cylinder hole formed at an upper surface thereof,
and which has a second arm formed at a top portion to be combined
with the cover and a second cylinder groove formed along a length
of the second rotary part in an inner surface thereof; a second
15 compressed spring which is installed in the second cylinder
chamber; a second rotary slip part which has a second rotary
slip hole formed at a center thereof, which has a second rotary
slip projection formed at an outer peripheral surface thereof
to be combined with the second cylinder groove, and which has
20 a second slip surface continuously and horizontally extending
to the second rotary slip hole while having two wave type of
bending when rotating each time; a second slip fixing portion
which has a second polygonal hole formed at a center thereof
and which has a second fixed slip surface corresponding to the
25 second rotary slip waving surface; and a second center shaft
which has a second polygonal projection to be combined with the
second polygonal hole and which is installed at a bottom surface
of the second rotary chamber to sequentially extend through the
second polygonal hole, the second rotary slip hole, the second
30 compressed spring and the second cylinder hole.

12. The hinge mechanism of portable phone according to claim 11, wherein a second cylinder projection is formed on an outer peripheral surface of the second cylinder, and a second stopper is formed on an inner surface in the second rotary chamber to allow the second cylinder projection to be latched thereon.

13. The hinge mechanism of portable phone according to claim 11, wherein a second cylinder projection is formed at a bottom surface of the second cylinder, and a second stopping groove is formed at a bottom of the second rotary chamber so that the second cylinder projection is inserted in the second stopping groove to stop the second cylinder at an initial position or at a position of being turned at 180 degree.

15

14. The hinge mechanism of portable phone according to claim 11, wherein a second arm projection is formed at a bottom surface of the second arm, and a second housing stopping groove is formed on an upper surface of the second housing so that the second arm projection is inserted in the second housing stopping groove to stop the second cylinder at an initial position or at a position of being turned at 180 degree.

15. The hinge mechanism of portable phone according to claim 11, wherein the second housing has a second cutoff portion through which a wire enters the second rotary chamber to electrically connect the cover to the body.

16. The hinge mechanism of portable phone according to claim 11, wherein a second annular groove is formed at an end

of the second center shaft, to which a second sealing is combined to fix the second cylinder to the second center shaft.

17. The hinge mechanism of portable phone according to
5 claim 11, wherein the second hinge chamber opens at an end thereof, which includes a first guide recess formed from the opened end to an interior of the second hinge chamber, and the second hinge part includes: a second hinge spring which is installed in the second hinge chamber; a second rotary hinge part which is inserted
10 in the second hinge chamber to enclose the second hinge spring, which has a second rotary hinge hole formed at a center portion thereof and a second rotary hinge projection formed thereon to be combined with the second guide recess, and which has a second rotary hinge surface continuously and horizontally extending
15 to the second rotary hinge hole while having two-wave type of bending when rotating each time; a second fixed hinge part which encloses the second fixed hinge part, which has a second fixed hinge hole corresponding to the second rotary hinge hole formed therein, and which has a second fixed hinge surface formed on
20 a surface to be corresponding to the second rotary hinge hole and a second fixed hinge projection formed on the other surface to be fixed to the body; and a second hinge shaft extending through the second hinge hole, the second rotary hinge hole and the second hinge spring to be fixed to the second hinge chamber.

25

18. The hinge mechanism of portable phone according to
claim 11, wherein the second hinge chamber opens at a top portion thereof, which has a second hinge chamber hole formed at a side thereof, and the second hinge part includes: a second rotary
30 hinge part which is fixedly installed in the second hinge chamber,

which has a second rotary hinge hole formed at a center portion thereof, and which has a second rotary hinge surface continuously and horizontally extending to the second rotary hinge hole while having two-wave type of bending when rotating each time; a second 5 fixed hinge part which is rotatably installed in the second hinge chamber, which has a second fixed hinge surface formed at a surface to be corresponding to the second rotary hinge surface, and which has a second hinge shaft formed on the second fixed hinge surface to be inserted in the second rotary hinge hole and a second fixed 10 hinge projection formed on the other surface to be inserted in the second hinge chamber hole; and a second hinge spring which is installed in the second hinge chamber to elastically urge the second rotary hinge part to the second fixed hinge part.

15 19. The hinge mechanism of portable phone according to claim 11, wherein the second hinge chamber opens at a side thereof, which has a second guide recess formed from an opened end to an interior thereof, and the second hinge part includes: a second hinge spring which is installed in the second hinge chamber; 20 a second rotary hinge part which is inserted in the second hinge chamber to enclose the second hinge spring, which has a second rotary hinge hole formed at a center portion thereof, and which has a second rotary hinge projection formed on an outer surface thereof to be combined to the second guide recess, and a second 25 rotary hinge surface; a second fixed hinge part which encloses the second fixed hinge part, which has a second fixed hinge hole corresponding to the second rotary hinge hole, and which has a second fixed hinge surface formed on a side thereof to be corresponding to the second rotary hinge surface and a second 30 fixed hinge projection formed on the other side thereof to be

fixed to the body; and a second hinge shaft extending through the second fixed hinge hole, the second rotary hinge hole and the second hinge spring to be fixed to the second hinge chamber.

5 20. The hinge mechanism of portable phone according to claim 11, wherein the second hinge part includes: a second hinge housing which has a second hinge housing chamber formed with an opened top portion and a second guide recess formed lengthwise on a side thereof, which has a second hinge housing hole formed at a side thereof and a second hinge housing projection formed on the other side thereof; a second rotary hinge part which is installed to the second hinge housing, which has a second rotary hinge projection formed on an outer surface thereof to be inserted in the second guide recess and a second rotary hinge hole formed at a center portion thereof, and which has a second rotary hinge surface continuously and horizontally extending to the second rotary hinge hole while having two-wave type of bending when rotating each time; a second fixed hinge part which is rotatably installed to the second hinge housing, which has a second hinge surface formed at a surface thereof to be corresponding to the second rotary hinge surface, which has a second hinge shaft formed on the second fixed hinge surface to be inserted in the second rotary hinge hole, and which has a second fixed hinge projection formed on the other surface to be inserted in the second hinge housing hole; and a second hinge spring installed to the second hinge housing in order that one end of the second hinge spring is combined to the second hinge housing projection and that the other end elastically supports the second rotary hinge part.

30 21. The hinge mechanism of portable phone comprising:

a third housing having a third rotary chamber with an opened top portion and a third hinge chamber formed at a side of the third rotary chamber, for mechanically connecting a cover to a body;

5 a third hinge part which is installed to the third hinge chamber, for opening and closing the cover; and

a third rotary part which is installed to the third rotary chamber, for rotating the cover,

wherein the third rotary part includes a third cylinder
10 which opens at a lower portion and has a third cylinder chamber, which has a third cylinder hole formed in an upper portion thereof and a third arm projected from the upper portion thereof to be combined with the cover, and which has a third cylinder groove formed lengthwise thereon; a third compressed spring which is
15 installed in the third cylinder chamber; a third rotary slip part which has a third rotary slip hole formed at a center portion thereof, which has a third cylinder hole formed on an upper surface thereon and a third arm projected from an upper portion to be combined with the cover, and which a third cylinder groove formed
20 lengthwise on an inner surface thereof; a third fixed slip part which has a third polygonal hole formed at a center portion thereof and which has a third fixed slip surface on an upper portion; and a third center shaft which has a third polygonal projection to be combined with the third polygonal hole, and which is
25 installed at a bottom surface of the third rotary chamber to sequentially extend the third polygonal hole, the third rotary slip hole, the third compressed spring and the third cylinder hole.

claim 21, wherein a pair of third balls is installed on the third rotary slip surface to be opposite to each other about the third rotary slip hole while a pair of third hemispheric groove is formed on the third fixed slip surface to face the pair of the 5 third balls, and third guide recess is formed to communicate the third hemispheric grooves.

23. The hinge mechanism of portable phone according to claim 21, wherein a pair of third balls is installed on the third 10 fixed slip surface to be opposite to each other about the third fixed slip hole while a pair of third hemispheric groove is formed on the third rotary slip surface to face the pair of the third balls, and third guide recess is formed to communicate the third hemispheric grooves.

15

24. The hinge mechanism of portable phone according to claim 21, wherein a pair of third projections is installed on the third rotary slip surface to be opposite to each other about the third rotary slip hole while a pair of third hemispheric 20 groove is formed on the third fixed slip surface to face the pair of the third projections, and third guide recess is formed to communicate the third hemispheric grooves.

25. The hinge mechanism of portable phone according to claim 21, wherein a third cylinder projection is formed on an outer peripheral surface of the third cylinder, and a pair of third stoppers is formed on opposite inner surfaces of the third rotary chamber, to which the third cylinder projection is latched.

30

26. The hinge mechanism of portable phone according to

claim 21, wherein the third housing has a third cutoff portion through which a wire enters the third rotary chamber to electrically connect the cover to the body.

5 27. The hinge mechanism of portable phone according to claim 21, wherein a third annular groove is formed at an end of the third center shaft, to which a third sealing is combined to fix the third cylinder to the third center shaft.

10 28. The hinge mechanism of portable phone according to claim 21, wherein the third hinge chamber opens at a side thereof, which includes a third guide recess formed from the opened end to an interior thereof, and the third hinge part includes: a third hinge spring which is installed in the third hinge chamber; 15 a third rotary hinge part which is inserted in the third hinge chamber to enclose the third hinge spring, which has a third rotary hinge hole formed at a center portion thereof, which has a third rotary hinge projection formed on an outer surface thereof to be combined with the third guide recess, and which has a third 20 rotary hinge surface continuously and horizontally extending to the third rotary hinge hole while having two-wave type of bending when rotating each time; a third fixed hinge part which encloses the third hinge spring, which has a third fixed hinge hole corresponding to the third rotary hinge hole, and which 25 has a third fixed hinge surface formed on a side thereof to be corresponding to the third rotary hinge surface and a third fixed hinge projection formed on the other side thereof to be fixed to the body; and a third hinge shaft extending through the third fixed hinge hole, the third rotary hinge hole and the third hinge 30 spring to be fixed to the third hinge chamber.

29. The hinge mechanism of portable phone according to claim 21, wherein the third hinge chamber opens at a side thereof, which includes a third guide recess formed from an opened end 5 to an interior thereof, and the third hinge part includes: a third hinge spring which is installed to the third hinge chamber; a third rotary hinge part which is inserted in the third hinge chamber to enclose the third hinge spring, which has a third rotary hinge hole formed at a center portion thereof, and which 10 has a third rotary hinge projection formed on an outer surface to be combined to the third guide recess and a third plain rotary hinge surface; a third fixed hinge part which encloses the third fixed hinge part, which has a third fixed hinge hole corresponding to the third rotary hinge hole, and which has a third fixed hinge 15 surface formed on a side thereof to be corresponding to the third rotary hinge surface and a third fixed hinge projection formed on the other side to be fixed to the body; and a third hinge shaft extending through the third fixed hinge hole, the third rotary hinge hole and the third hinge spring to be fixed to the 20 third hinge chamber.

30. The hinge mechanism of portable phone according to claim 21, wherein the third hinge chamber opens at a top portion thereof, which has a third hinge chamber hole formed at a side 25 thereof and a third guide recess formed lengthwise on an inner surface, and the third hinge part includes: a third hinge spring which is installed in the third hinge chamber; a third rotary hinge part which is inserted in the third hinge chamber to enclose the third hinge spring, which has a third hinge spring hole formed 30 at a center portion thereof, and which a third rotary hinge

projection formed on an outer surface thereof to be combined with the third guide recess and a third rotary hinge surface formed at a side thereof; a third fixed hinge part which encloses the third fixed hinge part, which has a third fixed hinge hole 5 corresponding to the third rotary hinge hole, and which has a third fixed hinge surface formed at a side thereof to be corresponding to the third rotary hinge surface and a third fixed hinge projection formed on the other side thereof to be fixed to the body; and a third hinge shaft extending through the third 10 fixed hinge hole, the third rotary hinge hole and the third hinge spring to be fixed to the third hinge chamber.

31. The hinge mechanism of portable phone according to claim 21, wherein the third hinge chamber opens at a top portion 15 thereof, which has a third hinge chamber hole formed at a side thereof and which has a third guide recess including a horizontal groove formed lengthwise on an inner surface thereof and a vertical groove being normal to the horizontal groove to be connected to the opening, and the third hinge part includes: 20 a third hinge spring which is installed to the third hinge chamber; a third hinge part which is inserted in the third hinge chamber to enclose the third hinge spring, which has a third rotary hinge hole formed at a center portion thereof, and which has a third rotary hinge projection formed on an outer surface thereof to 25 be combined to the third guide groove and which has a third rotary hinge surface formed at a surface; a third fixed hinge part which encloses the third fixed hinge part, which has a third fixed hinge hole corresponding to the third rotary hinge hole, and which has a third fixed hinge surface formed on a side thereof 30 to be corresponding to the third rotary hinge surface and a third

fixed hinge projection formed on the other side to be fixed to the body; and a third hinge shaft extending through the third fixed hinge hole, the third rotary hinge hole and the third hinge spring to be fixed to the third hinge chamber.

5

32. The hinge mechanism of portable phone according to claim 21, wherein the third hinge part includes: a third hinge housing which has a third hinge housing chamber with an opened top portion, which has a third guide groove formed lengthwise on a side wall thereof, and which has a third hinge housing formed at a side thereof and a third hinge spring projection formed at the other side thereof; a third rotary hinge part which is installed to the third hinge housing, which has a third rotary hinge projection formed on an outer surface to be inserted in the third guide recess and a third hinge hole formed at a center portion thereof, and which has a third rotary hinge surface continuously and horizontally extending to the third hinge hole while having two-wave type of bending when rotating each time; a third fixed hinge part which is rotatably installed to the third hinge housing, which has a third fixed hinge surface formed at a side thereof to be corresponding to the third rotary hinge surface, which has a third hinge shaft formed on the third fixed hinge surface to be inserted in the third rotary hinge hole, and which has a third fixed hinge projection formed at the other side thereof to be inserted in the third hinge housing hole; and a third hinge spring which is installed to the third hinge housing so that an end of the third hinge spring is combined to the third hinge spring projection and the other end elastically supports the second rotary hinge part.

33. The hinge mechanism of portable phone comprising: a fourth housing which includes a fourth rotary chamber with an opened top portion, for mechanically connecting a cover to a body;

5 a fourth hinge part which is installed to the fourth hinge chamber, for opening and closing the cover; and

a fourth rotary part which is installed to the fourth rotary chamber, for rotating the cover,

wherein the fourth rotary part includes: a fourth cylinder 10 which has a fourth cylinder chamber with an opened bottom and a fourth cylinder hole formed in an upper surface thereof, which has a fourth arm projected from an upper portion thereof to be combined with the cover, and which has a fourth cylinder groove formed lengthwise on an outer surface thereof; a fourth compressed 15 spring which is installed to the fourth cylinder chamber; a fourth rotary slip part which has a fourth rotary slip hole formed at a center portion thereof, which has a fourth rotary slip projection formed on an outer peripheral surface thereof to be combined to the fourth cylinder groove and a pair of fourth rotary 20 slip surface projected from a bottom surface thereof to be opposite to each other around the fourth rotary slip hole, and which has a fourth rotary plain surface formed at the upper portion thereof; a fourth fixed slip part which has a fourth polygonal hole at a center portion thereof, and which has a fourth fixed 25 slip surface corresponding to the fourth rotary slip surface and a fourth fixed plain surface corresponding to the fourth rotary plain surface; a fourth center shaft which has a fourth polygonal projection formed at a lower portion thereof to be combined to the fourth polygonal hole, and which is vertically 30 installed to a bottom surface of the fourth rotary chamber to

sequentially extend the fourth polygonal hole, the fourth rotary slip hole, the fourth compressed spring and the fourth cylinder hole.

5 34. The hinge mechanism of portable phone according to claim 33, wherein a fourth cylinder projection is formed at a bottom surface of the fourth cylinder, and a fourth stopping groove is formed at a bottom of the fourth rotary chamber, in which the fourth cylinder projection is inserted to stop the 10 fourth cylinder at an initial position or at a position of being turned at 180 degree.

15 35. The hinge mechanism of portable phone according to claim 33, wherein the fourth arm projection is formed at a bottom surface of the fourth arm, and a fourth housing stopping groove is formed on an upper surface of the fourth housing, in which the fourth arm projection is inserted to stop the fourth cylinder at an initial position or at a position of being turned at 180 degree.

20 36. The hinge mechanism of portable phone according to claim 33, wherein a fourth screw part is formed at an end of the fourth center shaft, with which a fourth nut is associated to fix the fourth center shaft to the fourth cylinder.

25 37. The hinge mechanism of portable phone according to claim 33, wherein the fourth hinge part includes: a fourth hinge housing which has a fourth hinge housing chamber with an opened upper portion, which has a fourth guide groove formed lengthwise 30 on an inner surface thereof, and which has a fourth hinge housing

hole formed at a side thereof and a fourth hinge spring projection formed at the other side thereof; a fourth rotary hinge part which is installed to the fourth hinge housing, which has a fourth rotary hinge projection formed on an outer surface to be inserted 5 in the fourth guide groove and a fourth rotary hinge hole formed at a center thereof, and which has a fourth rotary hinge surface continuously and horizontally extending to the fourth rotary hinge hole while having two-wave type of bending when rotating each time; a fourth fixed hinge part which is rotatably installed 10 to the fourth hinge housing, which has the fourth rotary hinge surface formed at a side thereof to be corresponding to the fourth rotary hinge surface, which has a fourth hinge shaft formed on the fourth fixed hinge surface to be inserted in the fourth rotary hinge hole, and which has a fourth fixed hinge projection formed 15 on the other surface thereof to be inserted in the fourth hinge housing hole; and which has a fourth hinge spring installed to the fourth hinge housing so that one end of the fourth hinge spring is combined to the fourth hinge spring and the other end elastically supports the fourth rotary hinge part.

20

38. The hinge mechanism of portable phone comprising:
a fifth housing which includes a fifth rotary chamber with an opened upper portion, which has a fifth screw hole formed at a bottom surface thereof and fifth polygonal projections formed 25 around the fifth screw hole, and a fifth hinge chamber formed at a side thereof, for mechanically connecting a cover to a body;
a fifth hinge part which is installed to the fifth hinge chamber, for opening and closing the cover; and
a fifth rotary part which is installed to the fifth rotary chamber, for rotating the cover,
30

wherein the fifth rotary part includes: a fifth cylinder which has a fifth cylinder chamber with an opened lower portion, which has a fifth cylinder hole formed on an upper surface thereof and a fifth arm projected from an upper portion to be combined 5 with the cover, and which has a fifth cylinder hole formed longwise on an outer surface; a fifth compressed spring which is installed in the fifth cylinder chamber; a fifth slip member which has a fifth rotary slip projection formed on an outer peripheral surface thereof to be inserted in the fifth cylinder hole, and 10 which is installed to the fifth cylinder chamber and supported by means of the fifth compressed spring to rotate the fifth cylinder by sliding action; and a fifth center shaft which has a fifth head portion formed at an upper portion and a fifth screw portion formed at a lower portion, and which sequentially extends 15 the fifth cylinder hole, the fifth compressed spring and the fifth slip member to be combined to the fifth screw hole.

39. The hinge mechanism of portable phone according to claim 38, wherein the fifth slip member includes: a fifth slip 20 part which has a fifth rotary slip hole formed at a center portion thereof and also a fifth rotary slip projection formed on an outer peripheral surface thereof to be combined to the fifth cylinder groove, and which continuously and horizontally extends to the fifth rotary slip hole while having two-wave type of bending 25 when rotating each time; and a fifth fixed slip part which has a fifth polygonal hole, in which the fifth polygonal projection is inserted, formed at a center portion thereof and which has a fifth fixed slip surface formed on an upper surface to be corresponding to the fifth rotary slip surface.

40. The hinge mechanism of portable phone according to claim 38, wherein the fifth slip member includes: a fifth rotary slip part which has a fifth rotary slip hole formed at a center portion thereof and a fifth rotary slip projection formed on an outer peripheral surface thereof to be combined to the fifth cylinder hole, and which has a fifth plain rotary slip surface formed at a bottom surface thereof; and a fifth fixed slip part which has a fifth polygonal hole, in which the fifth polygonal projection is inserted, formed at a center portion thereof and which has a fifth fixed slip surface formed on an upper portion to be corresponding to the fifth rotary slip surface.

41. The hinge mechanism of portable phone according to claim 38, wherein the fifth slip member includes: a fifth rotary slip part which has a fifth rotary slip hole formed at a center portion thereof, which has a fifth rotary slip projection formed on an outer peripheral surface thereof to be combined to the fifth cylinder hole and a pair of fifth rotary slip surfaces formed at a bottom surface thereof to be opposite to each other about the fifth rotary slip hole, and which has a fifth rotary plain surface formed at an upper portion of the fifth rotary slip surface; and a fifth fixed slip part which has a fifth polygonal hole, in which a fifth polygonal projection is inserted, formed at a center portion thereof and which has a fifth fixed slip surface corresponding to the fifth rotary slip surface and a fifth fixed plain surface corresponding to the fifth rotary plain surface.

42. The hinge mechanism of portable phone according to claim 38, wherein a fifth head portion of the fifth center shaft

has a fifth instrument hole, in which an instrument is inserted, formed on an upper surface thereof and a fifth washer formed at a lower surface thereof.

5 43. The hinge mechanism of portable phone according to claim 38, wherein the fifth hinge part includes: a fifth hinge housing which has a fifth hinge housing chamber with an opened upper portion, which has a fifth guide groove formed lengthwise in an inner surface, and which has a fifth hinge housing hole formed at a side thereof and a fifth hinge spring projection formed on the other side thereof; a fifth rotary hinge part which is installed at the fifth hinge housing, which has a fifth rotary hinge projection formed on an outer surface to be inserted in the fifth guide recess, which has a fifth hinge hole formed at a center portion thereof, and which has a fifth rotary hinge surface continuously and horizontally extending to the fifth rotary hinge hole while having two-wave type of bending when rotating each time; a fifth fixed hinge part which is rotatably installed to the fifth hinge housing, which has a fifth fixed hinge surface formed at a side thereof to be corresponding to the fifth rotary hinge surface and a fifth hinge shaft formed on the fifth fixed hinge surface to be inserted in the fifth hinge housing hole; and a fifth hinge spring which is installed to the fifth hinge housing so that one end of the fifth hinge spring is combined to the fifth hinge spring projection and the other end is inserted in the fifth hinge housing to elastically support the fifth rotary hinge part.

30 44. The hinge mechanism of portable phone comprising: a sixth housing including a sixth rotary chamber with an

opened upper portion, and a sixth fixing groove which is formed at a bottom surface and in which a sixth housing polygonal hole is formed, which has a sixth hinge part is installed at a side thereof to open and close a cover, for mechanically connecting 5 the cover to a body;

a sixth cylinder which has a sixth cylinder chamber with an opened lower portion, which has a sixth cylinder hole formed on an upper surface and a sixth arm projected from an upper portion to be combined with the cover, and which has a sixth cylinder 10 groove formed lengthwise in an inner surface thereof;

a sixth compressed spring which is installed in the sixth cylinder chamber;

a sixth slip member which has a sixth rotary slip projection formed on an outer peripheral surface thereof to be inserted 15 in the sixth cylinder groove, and which is installed in the sixth cylinder chamber to be supported by means of the sixth compressed spring so as to rotate the sixth cylinder by sliding action; and

a sixth center shaft which has a sixth polygonal projection 20 formed at an upper portion thereof to be inserted in the sixth housing polygonal hole, which has a sixth head portion formed at the sixth polygonal projection, and which sequentially extends through the sixth housing polygonal hole, the sixth slip member and the sixth cylinder hole to be fixed to the sixth fixed groove.

25

45. The hinge mechanism of portable phone according to claim 44, wherein the sixth slip member includes: a sixth rotary slip part which has a sixth rotary slip hole formed at a center portion thereof and a sixth rotary slip projection formed on 30 an outer peripheral surface thereof to be combined to the sixth

cylinder groove, and which has a sixth rotary slip surface continuously and horizontally extending to the sixth rotary slip hole while having two-wave type of bending when rotating each time; and

5 a sixth fixed slip part which has a sixth polygonal hole, in which the sixth polygonal projection is inserted, formed at a center portion thereof and which has a sixth fixed slip surface corresponding to the sixth rotary slip wave surface.

10 46. The hinge mechanism of portable phone according to claim 44, wherein the sixth slip member includes: a sixth rotary slip part which has a sixth rotary slip hole formed at a center portion thereof, which has a sixth rotary slip projection formed on an outer peripheral surface thereof to be combined to the 15 sixth cylinder groove and a sixth plain rotary slip surface at a bottom portion thereof, and which has a pair of sixth rotary hemispheric groove formed on the sixth rotary slip surface; a sixth fixed slip part which has a sixth polygonal hole, in which the sixth polygonal projection is inserted, formed at a center portion thereof, which has a sixth fixed slip surface formed 20 on an upper surface to be corresponding to the sixth rotary slip surface, and which has a sixth fixed hemispheric groove formed on the sixth fixed slip surface to be corresponding to the sixth rotary hemispheric groove; and a sixth ball which is inserted 25 in the sixth rotary hemispheric groove and the sixth fixed hemispheric groove.

47. The hinge mechanism of portable phone according to claim 44, wherein the sixth slip member includes: a sixth rotary slip part which has a sixth rotary slip hole formed at a center 30

portion thereof, which has a sixth rotary slip projection formed on an outer peripheral surface to be combined to the sixth cylinder groove and a pair of sixth rotary slip surfaces formed on a bottom surface thereof to be opposite to each other about the sixth 5 rotary slip hole, and a sixth rotary slip part which has a rotary plain surface formed at an upper portion of the sixth rotary slip surface; and a sixth fixed slip part which has a sixth polygonal hole, in which the sixth polygonal projection is inserted, formed at a center portion thereof, and which has a 10 sixth fixed slip surface corresponding to the sixth rotary slip surface and a sixth fixed plain surface corresponding to the sixth rotary plain surface.

48. The hinge mechanism of portable phone according to 15 claim 44, wherein a sixth cutoff portion is formed on an upper surface of the sixth housing, through which a wire enters the sixth rotary chamber to electrically connect the cover to the body.

20 49. The hinge mechanism of portable phone according to claim 44, wherein a sixth circuit pathway extends through the sixth housing from the sixth rotary chamber laterally.

25 50. The hinge mechanism of portable phone according to claim 44, wherein a sixth screw hole is formed at a lower portion of the sixth center shaft, to which a sixth screw is combined to fix the sixth cylinder to the sixth center shaft.

30 51. The hinge mechanism of portable phone according to claim 50, wherein a sixth instrument recess is formed on an upper

surface of the sixth screw, to which a rotary instrument is combined, and a sixth washer is disposed between the sixth cylinder and the sixth screw.

5 52. The hinge mechanism of portable phone according to claim 44, wherein a sixth pin hole is formed on an outer peripheral surface of an upper region of the sixth center shaft, to which a sixth pin is joined to fix the sixth cylinder to the sixth center shaft.

10

15 53. The hinge mechanism of portable phone according to claim 44, wherein a sixth position fixing hole is formed in the sixth fixing groove, and a sixth position fixing projection is formed at the sixth head portion to be inserted in the sixth position fixing hole.

20 54. The hinge mechanism of portable phone according to claim 44, wherein the sixth hinge part includes: a sixth hinge housing which has a sixth hinge housing chamber with an opened upper portion, which has a sixth guide recess formed longwise on an inner surface thereof, and which has a sixth hinge housing hole formed at a side thereof and a sixth hinge spring projection formed at the other side thereof; a sixth rotary hinge part which is installed to the sixth hinge housing, which has a sixth rotary hinge projection formed on an outer surface to be inserted in the sixth guide recess, which has a sixth rotary hinge hole formed at a center portion thereof, and which has a sixth rotary hinge surface continuously and horizontally extending to the sixth rotary hinge hole while having two-wave type of bending when 25 rotating each time; a sixth fixed hinge part which is rotatably 30

installed to the sixth hinge housing, which has a sixth fixed hinge surface corresponding to the sixth rotary hinge surface, which has a sixth fixed hinge surface formed on a side thereof to be corresponding to the sixth rotary hinge surface, which 5 has a sixth hinge shaft formed on the sixth fixed hinge surface to be inserted in the sixth rotary hinge hole, and which a sixth fixed hinge projection formed on the other side thereof to be inserted in the sixth hinge housing hole; and a sixth hinge spring which is installed to the sixth hinge housing so that one end 10 of the sixth hinge spring is combined to the sixth hinge spring and the other end elastically supports the sixth rotary hinge part.

55. The hinge mechanism of portable phone comprising:
15 a seventh housing which is installed at a side thereof to open and close a cover so as to mechanically connect the cover to a body;

20 a seventh fixed cylindrical part which is projected from an upper surface of the seventh housing, which has a pair of seventh grooves formed at a position opposite thereto on an outer peripheral surface thereof, and which has a seventh guide groove connecting the seventh grooves to each other;

25 a seventh rotary cylindrical part which is rotatably combined to the seventh fixed cylindrical part, which has a seventh center hole in which the seventh fixed cylindrical part, which has a pair of seventh arms formed at a position opposite thereto on an outer peripheral surface thereof, which has a seventh spring chamber formed lengthwise on the seventh arm, and which has a seventh connecting hole to connect the seventh 30 spring chamber to the seventh center hole;

a seventh moving member which is movably inserted in the seventh spring chamber, and which has a seventh projection extending through the seventh connecting hole so as to be inserted in the seventh groove; and

5 a seventh compressed spring which is inserted in the seventh spring chamber to elastically urge the seventh moving member to the seventh center hole.

10 56. The hinge mechanism of portable phone according to claim 55, wherein the seventh groove and seventh projection have a hemispheric shape.

15 57. The hinge mechanism of portable phone according to claim 55, wherein a seventh annular groove is formed on an outer peripheral surface of an upper portion of the seventh fixed cylindrical part, and a seventh sealing is seated in the seventh annular groove to fix the seventh rotary cylindrical part to the seventh fixed cylindrical part.

20 58. The hinge mechanism of portable phone according to claim 57, wherein a seven washer is disposed between the seventh rotary cylindrical part and the seventh sealing.

25 59. The hinge mechanism of portable phone according to claim 55, wherein a seventh circuit pathway is formed at a side of the seventh housing to be communicated with the seventh cylindrical part.

30 60. The hinge mechanism of portable phone according to claim 55, wherein the seventh hinge part includes: a seventh

hinge housing which has a seventh hinge housing chamber with an opened upper portion, which has the seventh guide recess formed lengthwise on an inner surface thereof, which has a seventh hinge housing formed at a side thereof, and which has a seventh hinge 5 spring projection formed on the other side thereof; a seventh rotary hinge part which is installed to the seventh hinge housing, which has a seventh rotary hinge projection formed on an outer peripheral surface thereof to be inserted in the seventh guide recess, which has a seventh rotary hinge hole formed at a center 10 portion thereof, and which has a seventh rotary hinge surface continuously and horizontally extending to the seventh rotary hinge hole while having two-wave type of bending when rotating each time; a seventh fixed hinge part which is rotatably installed to the seventh hinge housing, which has a seventh fixed hinge 15 surface formed at a side thereof to be corresponding to the seventh rotary hinge surface, which has a seventh hinge shaft formed on the seventh fixed hinge surface to be inserted in the seventh rotary hinge hole, and which has a seventh fixed hinge projection formed on the other side thereof to be inserted in the seventh 20 hinge housing hole; and a seventh hinge spring which is installed to the seventh hinge housing so that one end of the seventh hinge spring is combined to the seventh hinge spring and the other end elastically supports the seventh rotary hinge part.

25 61. The hinge mechanism of portable phone comprising:
 a housing which has an eighth rotary chamber of which an eighth hinge part is installed at a side to open and close a cover, with an opened upper portion, for mechanically connecting the cover to a body;
30 an eighth center shaft which has an eighth peripheral groove

formed on an outer peripheral surface thereof, which has an eighth moving member installed in the eighth peripheral groove so as to be elastically supported, and which is fixed to a bottom surface of the eighth rotary chamber;

5 an eighth cylinder which has an eighth cylinder chamber with an opened lower portion, which has an eighth cylinder hole formed on an upper surface thereof, which has an eighth cylinder groove formed on an inner peripheral surface thereof in which the eighth moving member is inserted, and which is rotatably
10 installed to the eighth center shaft; and
 an eighth arm which is joined to an upper end of the eighth cylinder to be connected to the cover.

62. The hinge mechanism of portable phone according to
15 claim 61, wherein an eighth spring hole is formed in the eighth peripheral groove of the eighth center shaft, in which an eighth center shaft spring is installed in the eighth spring hole to elastically support the eighth moving member.

20 63. The hinge mechanism of portable phone according to
 claim 61, wherein a bending portion is formed at a surface of the eighth moving member, and an eighth spring projection is formed at the other surface of the eighth moving member in which the eighth center shaft spring is inserted.

25 64. The hinge mechanism of portable phone according to
 claim 61, wherein the eighth cylinder groove is formed in a concave shape along a length of the eighth cylinder, and an eighth bending portion is formed on a surface of the eighth moving member to
30 be corresponding to the eighth cylinder groove while an eighth

spring projection is formed at the other surface of the eighth moving member, in which the eighth center shaft spring is inserted.

5 65. The hinge mechanism of portable phone according to claim 61, further comprising an eighth compressed spring installed in an upper end surface of the eighth center shaft and an inner surface of the eighth cylinder.

10 66. The hinge mechanism of portable phone according to claim 61, wherein an eighth post is projected from an upper end of the eighth center shaft in which an eighth pin hole is perforated, and wherein an eighth pin is inserted in the eighth pin hole so that the eighth cylinder is fixed to the eighth center shaft.

15 67. The hinge mechanism of portable phone according to claim 61, wherein the eighth hinge part includes: an eighth hinge housing which has an eighth hinge housing chamber with an opened upper portion, which has an eighth guide groove formed lengthwise 20 in a surface thereof, and which has an eighth hinge housing hole formed at a side thereof and an eighth hinge spring projection formed on the other surface thereof; an eighth rotary hinge part which is installed to the eighth hinge housing, which has an eighth rotary hinge projection formed on an outer surface to 25 be inserted in the eighth guide recess and an eighth rotary hinge hole formed at a center portion thereof, and which has an eighth rotary hinge surface continuously and horizontally extending to the eighth rotary hinge hole while having two-wave type of bending when rotating each time; an eighth fixed hinge part which 30 is rotatably installed to the eighth hinge housing, which has

an eighth fixed hinge surface formed at a surface thereof to be corresponding to the eighth rotary hinge surface, which has an eighth hinge shaft formed on the eighth fixed hinge surface to be inserted in the eighth rotary hinge hole, and which has
5 an eighth fixed hinge projection formed at the other surface thereof to be inserted in the eighth hinge housing hole; and an eighth hinge spring which is installed to the eighth hinge housing so that the one end of the eighth hinge spring is combined to the eighth hinge spring projection and the other end
10 elastically supports the eighth rotary hinge part.

68. The hinge mechanism of portable phone according to one of claims 1, 11, 21, 33, 38, 44, 55 and 61, wherein a camera lens is attached to an inner surface or outer surface of the
15 cover to take a picture, and wherein a control switch is installed to a side of the body to control an operation of the camera lens.

69. The hinge mechanism of portable phone according to one of claims 1, 11, 21, 33, 38, 44, 55 and 61, wherein a camera
20 lens is attached to an inner surface or outer surface of the body to take a picture, and wherein a control switch is installed to a side of the body to control an operation of the camera lens.